

**Sawyer Beach, Rye  
Water Quality Report  
Summer 2007**



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## Background

The New Hampshire Department of Environmental Services (DES) has operated a Public Beach Inspection Program, commonly called the Beach Program, for over 20 years. A coastal beach monitoring program was initiated in 1989 and the program continues to provide weekly summer monitoring. DES recognizes a health threat may exist at public beaches. Therefore, increased beach monitoring and bacteria source tracking have been implemented to protect public health.

Coastal beaches are monitored for the presence of the fecal bacteria *Enterococci*. These bacteria are present in the intestines of warm-blooded animals, including humans. They are known as indicator organisms, meaning their presence in water may indicate the presence of other potentially pathogenic (disease-causing) organisms. When fecal bacteria are present in high concentrations and ingested by beach visitors, common gastrointestinal illnesses such as nausea, vomiting, and diarrhea may occur.

In October 2000, the United States Environmental Protection Agency (EPA) signed into law the Beaches Environmental Assessment and Coastal Health (BEACH) Act. The BEACH Act is an amendment to the Clean Water Act. The BEACH Act authorizes EPA to award grants to eligible states with the purpose of developing and implementing monitoring and notification programs. The goal is to protect the public from exposure to pathogenic organisms in coastal recreation waters.

DES first received BEACH grant funding in 2002. Funds were used consistent with EPA's performance criteria requirements published in the *National Beach Guidance and Required Performance Criteria for Grants* document ([www.epa.gov/waterscience/beaches/grants](http://www.epa.gov/waterscience/beaches/grants)). DES has successfully met all requirements and continues to expand the monitoring and notification program. In 2002, only nine coastal beaches were monitored. The number has varied between 15 and 16 beaches since 2003. A beach in Hampton was added to the program in 2007 and was sampled every other week. In 2004, volunteers sampled Star Island beach, but circumstances did not allow for this cooperative effort in 2005 and 2006. DES hopes to reinstitute this sampling in 2008.

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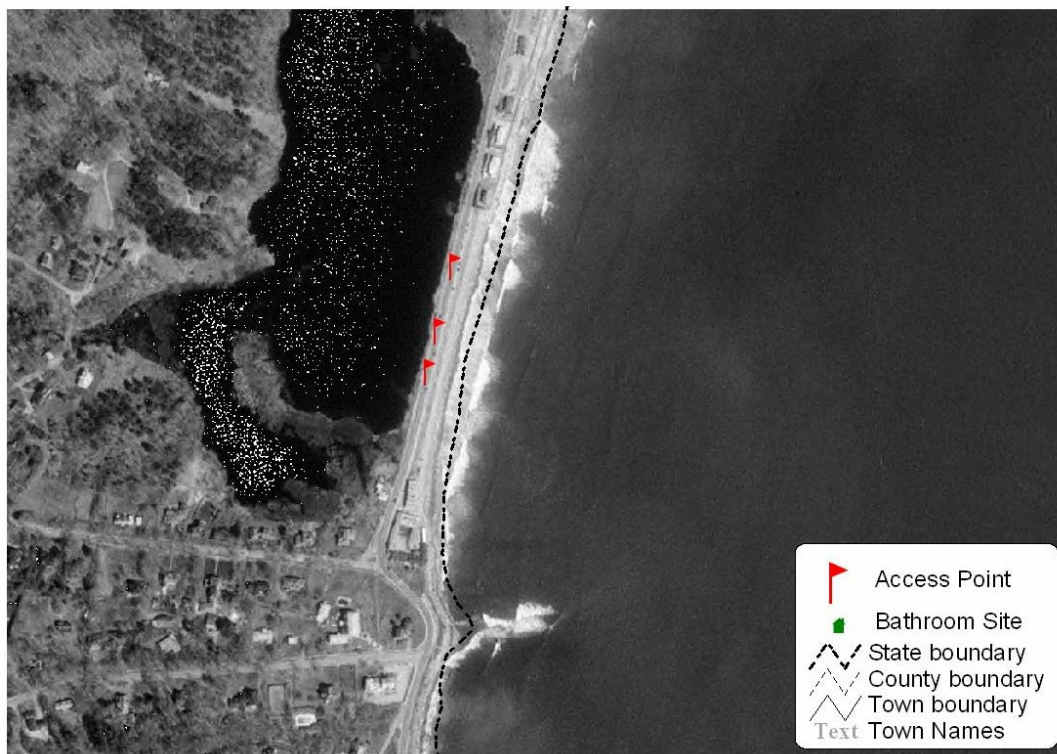
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## What are the basic details about the beach?

Sawyer Beach, located on Route 1A, is owned and maintained by the town of Rye.

The substrate at Sawyer Beach is comprised of sand and rocks. The beach is 1,261 feet long and it is used by the public for swimming, walking, and surfing, among other recreational activities. There are three access points to the beach area from the parking area (Figure 1). Lifeguards are present throughout the summer but toilet facilities are not available.

Waterfowl are frequently observed at the beach. The most commonly observed waterfowl are gulls and plovers. Large flocks of gulls typically congregate at the northern end of the beach by the discharge from Eel Pond. The town of Rye restricts dogs at Sawyer beach from 8 am to 6 pm from the end of May until the beginning of October.



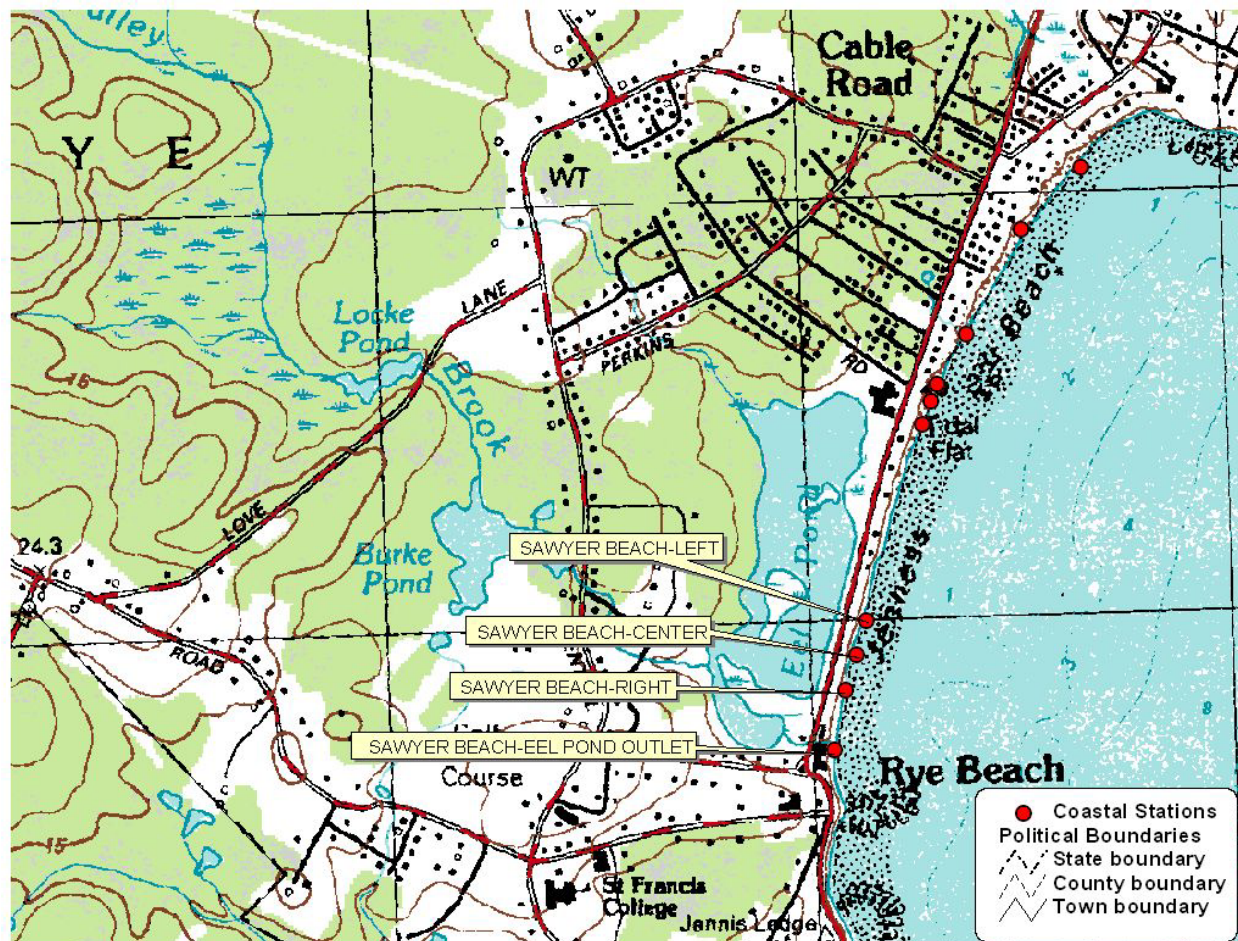
**Figure 1. Sawyer Beach Access Points and Restroom Facilities.**

At Sawyer Beach, samples are collected at the left, center, and right stations regularly (Table 1). All stations are evenly distributed along the shoreline (Figure 2) and can be accessed via the parking lot (Figure 1). Additional samples were also collected from Eel Pond Outlet which is south of Sawyer Beach (Table 1).



**Table 1. Sawyer Beach Station Descriptions and Latitude/Longitude Points.**

Station Description	Latitude	Longitude
<b>Left Sample Station:</b> Located straight in front of the northern ramp entrance to the beach, not far from the Eel Pond outlet.	42° 58' 51.7557"	-70° 45' 50.2860"
<b>Center Sample Station:</b> Located straight in front of the main beach entrance and lifeguard tower.	42° 58' 49.1665"	-70° 45' 51.3064"
<b>Right Sample Station:</b> Located straight in front of the southern ramp entrance to the beach.	42° 58' 46.4040"	-70° 45' 52.5234"
<b>Eel Pond Sample:</b> Located where the culvert discharges to the beach area.	42° 58' 41.8600"	-70° 45' 53.7900"



**Figure 2. Sawyer Beach Monitoring Stations.**

## **How often is the beach sampled and how was this determined?**

Sawyer Beach is a Tier I beach based on the Beach Program's Risk-Based Evaluation ranking system and sampled twice per week. This ranking indicates that there is frequent use of this beach, as compared to other coastal beaches. The sampling frequency was increased from once a week to the current twice a week in 2006, a result of increased beach usage.

The Beach Program developed a risk-based beach evaluation process and tiered monitoring approach during the 2003 beach season based on the EPA performance criteria. Beach evaluations are conducted annually to determine potential health threats to the public. Evaluations are based on several criteria in three main categories: beach history, microbial pathogen sources, and beach use. Beaches are now assessed as impaired for bacteria based on the most recent version of the Consolidated Assessment and Listing Methodology (CALM). The CALM assesses beach units as impaired based on historical exceedances of both the single sample and geometric mean bacteria standards. This report is submitted to EPA every two years.

Based on the evaluations, beaches are assigned a Tier I, Tier II, or Tier III status. Tier I beaches are considered "high priority" and have an increased potential to affect public health. Tier II beaches are "medium priority." Tier III are "low priority" beaches that have less potential to affect public health. Beach sample frequency is based on Tier status; Tier I were sampled twice per week, Tier II beaches were sampled once per week, and Tier III beaches were sampled once every other week in 2007.

The number of samples collected at each beach is determined by the beach length. Beaches less than 100 feet in length are sampled at left and right locations 1/3 of the distance from either end of the beach. Beaches greater than 100 feet in length are bracketed into thirds and sampled at left, center and right locations. Routine sample collection may be enhanced by sampling known or suspected pollution sources to the beach area. Also, storm event sampling may be conducted at beaches where runoff from rain is expected to impact beach water quality.

## **What are the standards for coastal beaches?**

Beaches are monitored to ensure compliance with state water quality standards. Marine waters are analyzed for the presence of the fecal bacteria Enterococci. Enterococci are known as indicator organisms, meaning their presence may indicate the presence of other pathogenic organisms. The state standard for Enterococci at public beaches is 104 counts/100 mL in one sample, or a geometric mean of 35 counts/100 mL in three samples collected over sixty days. When samples exceed the standard, a beach advisory is issued. Beach advisories remain in effect until subsequent beach sampling indicates acceptable water quality that is protective of public health.

## **What were the results from this past summer?**

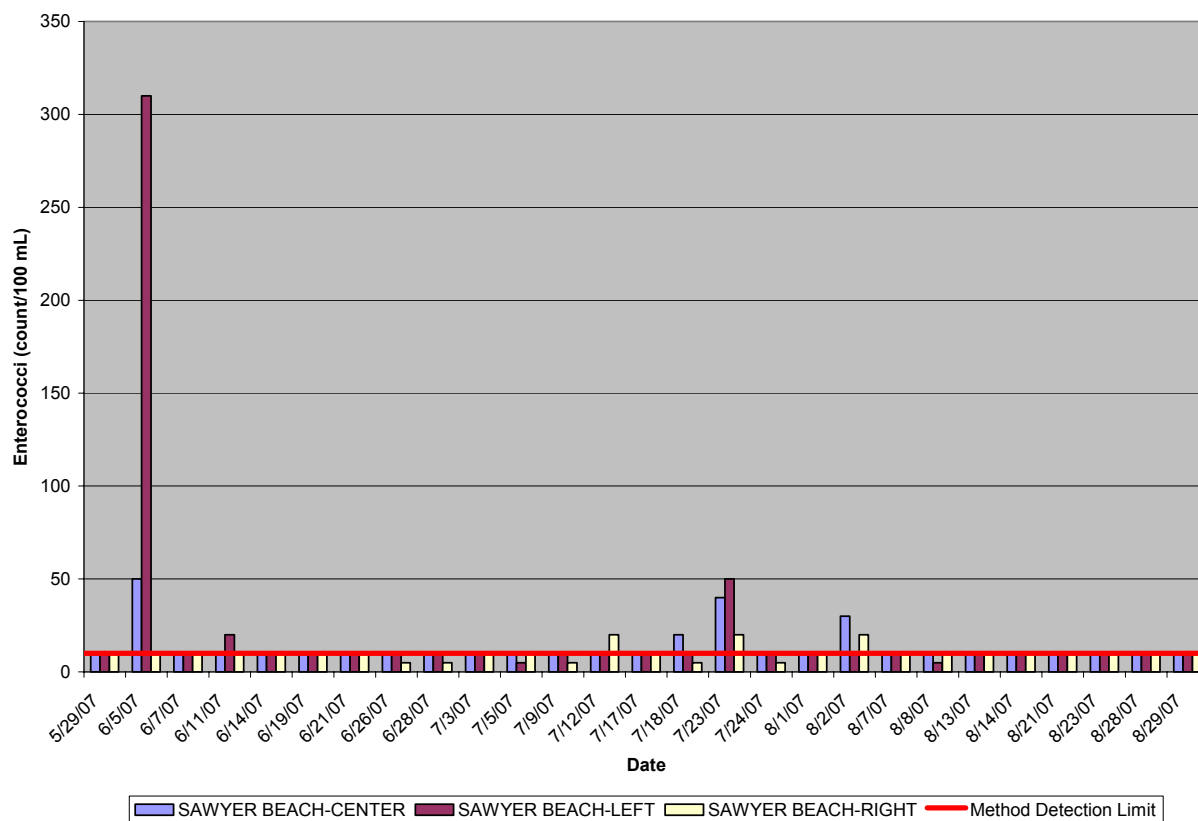
The 2007 sampling season began May 29th. The sampling season encompassed 94 days. Precipitation was recorded on 28 days over the summer (based on Seabrook WWTF recorded

precipitation). June wetfall totaled 2.83 inches, there were 2.62 inches of rain in July, and 0.78 inches of rain fell during August.

Samples were collected for Enterococci analysis during 27 routine inspections. Eighty-one samples were collected at Pirates Cove Beach (Appendix B). Overall, the 2007 summer Enterococci levels were moderate and within the state's standards (Figure 3). No advisories were issued for Sawyer Beach in 2007.

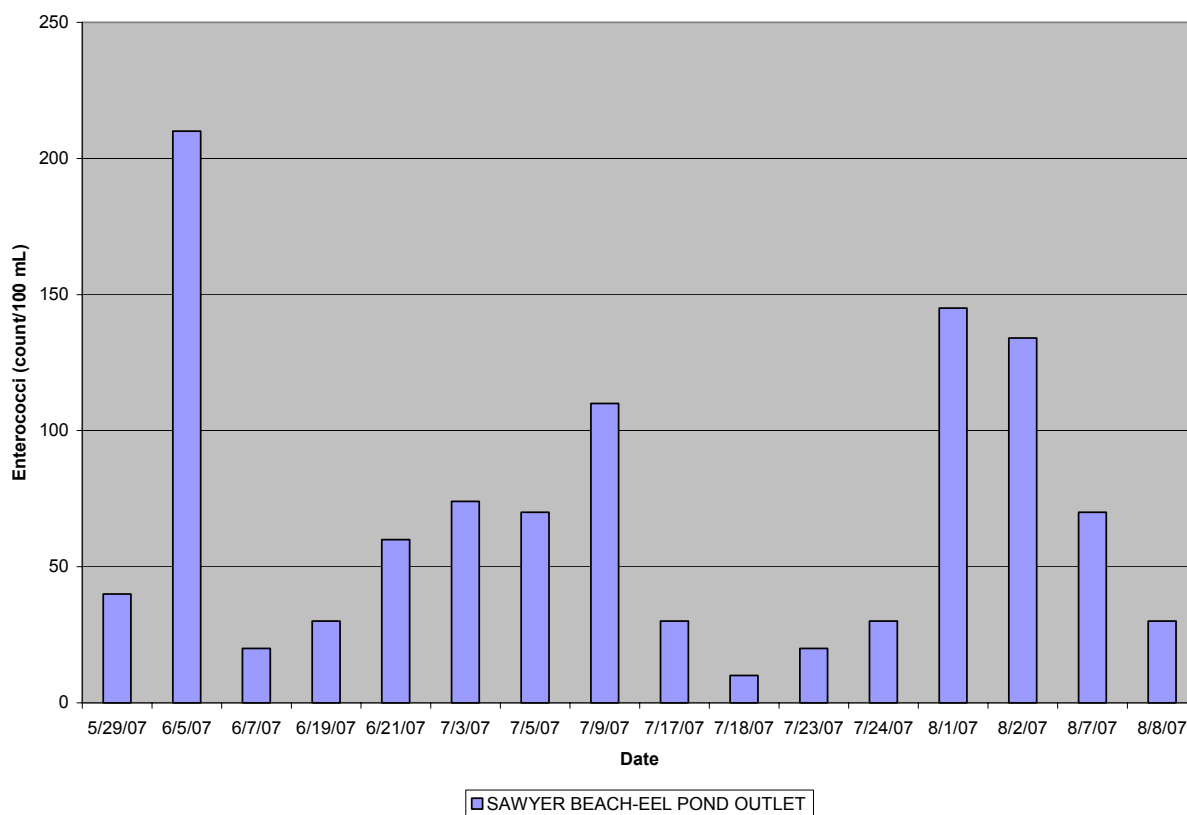
Sawyer Beach had a very high Enterococci count (310/100 mL) at the left sampling station on June 5 (Figure 3). The center station also had an elevated Enterococci count. This high bacteria level is associated to the over two inches of wetfall within the previous 24 hours of sampling. Excessive wetfall and associated stormwater runoff increase the bacteria load to the beach area. Feces from the large number of waterfowl usually present at the left sampling station is the probable source of Enterococci loading to the beach. The Eel Pond Outlet also had an elevated bacteria count on June 5 (Figure 4), increasing the high Enterococci level measured at the left sampling station. Sawyer Beach was re-sampled on June 7 and the bacteria levels had declined to within the state standards for designated beaches.

Sawyer Beach had a slight Enterococci elevation again on July 23, with the highest count measured again at the left sampling station. The highest numbers of waterfowl observed at the beach on July 23rd coincided with the elevated bacteria measured at Sawyer Beach on that date, indicating that wastes from these birds contribute to the beach bacteria load.



**Figure 3. Sawyer Beach 2007 Enterococci Data.**

The Eel Pond discharge was sampled 16 times this summer and frequently yielded elevated Enterococci counts. Elevated bacteria counts were often associated with samples collected after periods of precipitation (Figure 4, Appendix C). The discharge was often sampled at low tide when outlet flow is directed toward the beach area. High tide samples may reflect lower bacteria counts as backflow from the ocean dilutes the discharge water and bacteria.



**Figure 4. Eel Pond Outlet 2007 Enterococci Data.**

### **Are there any areas of concern?**

The discharge from Eel Pond is the major cause for concern at Sawyer Beach. Eel Pond supports several waterfowl populations, including ducks, geese, and swans. The fecal wastes from these waterfowl contain bacteria that likely contaminate the Sawyer Beach area when the pond discharges to the beach. The warmer discharge water from the Eel pond outlet flowing across Sawyer Beach attracts large numbers of gulls that defecate on the beach and contribute to the bacteria load.



Beach Inspectors noticed young children playing in the Eel Pond discharge on several occasions this summer. Children are more susceptible to waterborne illnesses and must be discouraged from contacting the Eel Pond discharge to decrease any potential health risk. Rye town officials should erect a sign near the outlet that warns the public of the health risk associated with high bacteria levels. DES can provide signs if officials are interested.

## **What suggestions can be made for future projects?**

DES received a complaint during the summer of 2004 that a septic pump trunk was observed at the Eel Pond Outlet. The complainant was informed that it was illegal to discharge waste or rinse hoses in Eel Pond. The complainant was informed to call DES if he observed the septic truck at the site and to provide additional information about the septage hauler.

As mentioned previously, seagulls are observed congregating along the Eel Pond Discharge at the Sawyer Beach left station. Research indicates that birds create significant bacteria concentrations that result in beach advisories. Inspectors noted between 50 and 200 waterfowl near the left sampling station along the Eel Pond discharge. There were numerous occasions when inspectors noted the beach was covered in waterfowl feces. Some waterfowl are capable of defecating up to 28 times per day. Their fecal material contains millions of bacteria that are potentially harmful to public health.

- The town of Rye, local businesses, or school group should join DES's Adopt-a-Beach Program. The program would consist of beach clean-ups and water quality monitoring. DES would conduct training sessions and participate in education and outreach activities for the community.
- Beach Inspectors noticed young children playing in the Eel Pond discharge on several occasions this summer. Children are more susceptible to waterborne illnesses and must be discouraged from contacting the Eel Pond discharge to decrease potential health risks. Rye town officials should erect a sign near the outlet that warns the public of health risks associated with high bacteria levels. DES can provide signs if officials are interested.

If you are interested in either of these future suggestions, please contact Sonya Carlson at (603) 271-0698 or [sonya.carlson@des.nh.gov](mailto:sonya.carlson@des.nh.gov).

## **2007 Beach Program Special Study**

During the summer of 2007, a special project was conducted at four coastal New Hampshire beaches, including Seabrook Town Beach, Sun Valley Beach, North Hampton State Beach, and Sawyer Beach. The study was initiated to determine the presence and concentration of bacteria in the sand and groundwater at New Hampshire's beaches. Studies conducted throughout the country showed that bacteria can prosper in these environments.

Preliminary data from this study show little or no contamination of the sand or underlying groundwater at these four beaches. Watch for the final report on the Beach Program website: [www.des.nh.gov/Beaches](http://www.des.nh.gov/Beaches).

## **Appendix A: Special Report 2007—Litter**

### **Introduction**

When you are getting ready to go to the beach in the morning, what do you pack? If you're like most people, you will bring towels, sunscreen, maybe an umbrella, and most likely food. Chances are, your food has packaging of some kind, whether it's plastic, paper, styrofoam, or cellophane. Do you remember to bring a garbage bag for all your trash?

No matter what beach you go to, you will likely see litter. Humans create litter every where they go. But it is especially disturbing to see litter on a beach, where so many people go to relax on a hot summer day. Unfortunately, trash is a problem at many of New Hampshire's beaches. To combat litter, regular citizens volunteer to help pick up litter at beaches. Data from clean ups events demonstrate the problem is not going away. The Beach Program is working on an outreach program to convince people to stop littering the beaches.

### **Trash is a problem**

The water at New Hampshire's coastal beaches is generally clean. Each year, only one or two swimming advisories are issued along the coast. The Beach Program receives multiple complaints, however, of trash on the beaches and especially Hampton Beach. This past summer, an especially irate resident of Hampton left a five minute voice mail regarding the state of the beach during the sand castle competition. The resident was taking her small children to see the sand castles and was discouraged by the garbage greeting them when they arrived.

Hampton Beach State Park, like all state parks in New Hampshire, is a carry-in/carry-out beach. Whatever trash you bring with you must leave with you. At most state parks, including the southern portion of Hampton Beach, small trash bags are given to arriving visitors. Hampton Beach even has trash barrels along the Route 1A sidewalk, with one at every stairwell to the beach. These measures have not helped to reduce the amount of trash found on the beach.

In an effort to clean the beach, the state park administrators purchased a trash collecting machine. The machine is used early every morning to rake the sand and collect large trash items. Smaller items, like cigarette butts, straws, and food wrappers, are missed. Despite the use of the trash collector, Hampton Beach still remains coated in litter throughout much of the summer.

After several complaints about the litter problem on the beach, the Beach Program contacted the Blue Ocean Society for Marine Conservation. Blue Ocean (as the group is more commonly known) has administered an Adopt-a-Beach program at other area beaches for many years. An Adopt-a-

Beach program was established at Hampton Beach in 2005. Blue Ocean and the NH Department of Environmental Services now partner to locate volunteers and provide them with the supplies necessary to conduct beach cleanups at Hampton Beach.

### **Beach clean up participants collect more garbage each year**

Unfortunately, the litter problem is not going away, and, in fact, seems to be getting worse. Blue Ocean volunteers track the types and amounts of trash collected during each clean up event at Hampton Beach. In 2005, volunteers collected 1,358 pounds of trash at Hampton Beach. The amount collected in 2006 was a record 2,117 pounds. In 2007, the total was slightly less at 1,950 pounds of trash. During 2007, volunteers also collected a total of 2,821 pounds of garbage from Fort Stark, Janness Beach, North Beach, the Sunken Forest area at Ordiorne Point, Wallis Sands, and Ragged Neck.

The Ocean Conservancy, another community organization, sponsors yearly beach clean up events along the coastline. The non-profit environmental organization holds an International Coastal Cleanup day every September. In 2005, 651 pounds of trash were collected during the Coastal Cleanup day at Hampton Beach and 458 pounds were collected in 2006. The amount collected September 15, 2007 was down to 351 pounds. The 2008 cleanup day is being organized for this coming September. Although the weight went down recently, more clean-up days are being organized and more volunteers are becoming involved.

### **Outreach program to address litter problems**

Data collected from clean-up events show increased quantities of collected trash. Beach litter is not an isolated problem with only one solution. Many organizations, towns, and volunteers can work with various government agencies to make beaches a more pleasant and safe destination for everyone. More volunteers are needed to pick up the increasing trash volumes from New Hampshire's coastal beaches. More outreach is needed to remind beach goers that each person can help keep New Hampshire beaches clean. Programs and partnerships can be expanded to provide information, trash receptacles and recycling containers to reduce beach litter. With more outreach, education, and resources, change in the people's behavior at public beaches can become a reality.

## Appendix B: Sawyer Beach 2007 Data by Date

Date	Enterococci (count/100 mL)			Rainfall in previous 24 hours (inches)	Number of bathers	Animal Presence
	Left	Center	Right			
5/29/07	10	10	10	0	0	10 gulls
6/5/07	310	50	10	2.23	3	40 gulls
6/7/07	10	10	10	0	1	100 gulls
6/11/07	20	10	10	0	0	40 gulls
6/14/07	10	10	10	0	0	12 gulls
6/19/07	10	10	10	0	4	110 gulls
6/21/07	10	10	10	0.03	0	100 gulls
6/26/07	10	10	5	0	5	100 gulls
6/28/07	10	10	5	0	1	5 gulls
7/3/07	10	10	10	0	0	50 gulls
7/5/07	5	10	10	1.40	3	50 gulls
7/9/07	10	10	5	0.16	0	100 gulls
7/12/07	10	10	20	0.38	10	0
7/17/07	10	10	10	0	17	50 gulls
7/18/07	10	20	5	0.05	10	100 gulls
7/23/07	50	40	20	0	0	175 gulls, 25 plovers
7/24/07	10	10	5	0.14	0	100 gulls, 20 plovers
8/1/07	10	10	10	0	35	50 gulls
8/2/07	10	30	20	0	10	50 gulls
8/7/07	10	10	10	0.44	14	50 gulls, 10 plovers
8/8/07	5	10	10	0.23	0	150 gulls, 10 plovers
8/13/07	10	10	10	0	4	30 gulls
8/14/07	10	10	10	0	17	15 plovers
8/21/07	10	10	10	0	16	100 gulls, 10 plovers
8/23/07	10	10	10	0	1	50 gulls, 10 plovers
8/28/07	10	10	10	0.03	20	20 gulls
8/29/07	10	10	10	0	4	5 gulls

## Appendix C: Eel Pond Outlet Enterococci 2007 Data

Date	Enterococci (count/100 mL)	Tide
5/29/07	40	High
6/5/07	210	Low
6/7/07	20	Low
6/19/07	30	Low
6/21/07	60	Low
7/3/07	74	Low
7/5/07	70	Low
7/9/07	110	Low
7/17/07	30	Low
7/18/07	10	Low
7/23/07	20	Low
7/24/07	30	High
8/1/07	145	Low
8/2/07	134	Low
8/7/07	70	High
8/8/07	30	High